

## ORIGINAL ARTICLE

# The adequacy of Hepato-Pancreato-Biliary training: how closely do perceptions of fellows and programme directors align?

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## Abstract

**Background:** Hepatopancreatobiliary fellowship programmes have recently undergone significant changes with regards to training standards, case-volume thresholds and multimodality educational platforms. The goals of this study were to compare the perspectives of fellows and programme directors (PDs) on perceptions of readiness to enter practice and identify core Hepato-Pancreato-Biliary (HPB) procedures that require increased emphasis during training.

**Methods:** This survey targeted PDs and trainees participating in the Fellowship Council/AHPBA pathway. Data related to demographics, education and career plans were collected. Analysis of PD and fellow opinions regarding their confidence to perform core HPB procedures was completed.

**Results:** The response rate was 88% for both fellows (21/24) and PDs (23/26). There was good agreement between PDs and fellows in the perception of case volumes. Select differences where PDs ranked higher perceptions included major hepatectomies (PDs: 87% versus fellows: 57%,  $P = 0.04$ ), pancreaticoduodenectomies (100% versus 81%,  $P = 0.04$ ) and laparoscopic distal pancreatectomies (78% versus 43%,  $P = 0.03$ ). 'Good or excellent' case volumes translated into increased fellow readiness, except for some pancreatitis procedures, laparoscopic distal pancreatectomies and potentially major hepatectomies.

**Conclusions:** This study provides insight into content domains that may require additional attention to achieve an appropriate level of proficiency and confidence upon completion of training.

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## Introduction

Repeated and interactive feedback is essential amongst all surgical training programmes if the goals of the paradigm include (i) identification of areas of weakness, (ii) implementation of strategies to modify and improve training, and (iii) evaluation of outcomes.<sup>1</sup> The ultimate mission of all advanced postgraduate surgical training programmes remains the graduation of a competent, confident and skilled surgeon within a particular subspecialty who has the ability to offer high-quality care for patients, as well as stay current using various avenues within the continuing medical education arena.<sup>1</sup>

This study was presented at the Annual Meeting of the AHPBA, 11-15 March 2015, Miami, Florida.

Although the literature is abundant with multiple studies evaluating the educational components of residency training programmes,<sup>2,3</sup> data surrounding postgraduate fellowships are sparse.<sup>4</sup> This is particularly evident in the field of Hepato-Pancreato-Biliary (HPB) surgery. As a result, the HPB Manpower and Education Study was conducted to describe the current state of HPB surgery within North America.<sup>5</sup> Publications and data from this ongoing study have raised significant concerns regarding fellows' preparedness for entering independent HPB practice.<sup>5</sup> Similar to previous work by our authorship group within thoracic surgery,<sup>6,7</sup> it is clear that areas of operative weakness must first be identified in an effort to subsequently target components that require educational improvement.

The primary goal of this study was, therefore, to identify and define the specific areas of perceived operative weakness

within North American HPB-specific training programmes (Fellowship Council/AHPBA) by comparing the perceptions of both programme directors (PD) and fellows. We also sought to evaluate fellows' exposure to core HPB procedures and determine if exposure correlated with subjective ratings of operative ability.

## Methods

The survey was created by a multidisciplinary group with significant experience on this topic.<sup>1</sup> A preliminary list of items, including a ranking of core HPB procedures, was established by the authors. A modified Delphi process was then employed to refine the list. Feedback from eight surgeons in two countries was then solicited to increase face and content validity. This cross-sectional study employed self-reported web-based surveys to collect data from HPB trainees and PDs (26 fellowship programmes in the Fellowship Council/AHPBA training pathway, from the US and Canada). This list of both PDs and fellows was available on the Fellowship Council website. Distinct surveys were developed for each group, and question types included multiple-choice, open-field, rating and ranking questions. All multiple-choice questions, with single or multiple answers, included an open field for additional comments. Previously employed five-level rating scales were developed for the qualitative evaluation of training programmes and comparative analysis of PDs' and fellows' opinions. Domains explored in each survey are listed in Table 1.

An online platform (SurveyMonkey®; SurveyMonkey Inc, Palo Alto, CA, USA) was utilized to deliver the survey. The first email was sent to all participants with general information, an invitation letter and a web-link to the survey's webpage. Reminder emails to encourage participation were distributed every 2 weeks. The survey was deployed between 1 April and 30 May 2014 with the goal of capturing aspects and perceptions of training quality towards the end of the academic training year. Responses were captured anonymously to maintain

confidentiality owing to the small sample sizes and sensitive nature of the information.

Data on demographics, education and career plans were collected. A comparative analysis of PDs' and trainees' opinions on their confidence to perform 13 core HPB procedures was completed ( $P < 0.05$ ). Statistical analyses employed SPSS version 16.0 (SPSS Inc., Chicago, IL, USA). The analysis included descriptive summaries for each group, as well as Fisher's exact and chi-square test. Ethics approval for this study was obtained from the University of Calgary. It was also approved by both the Fellowship Council and AHPBA.

## Results

### Fellows: demographics, training and career goals

Twenty-one out of 24 fellows completed the survey (88%). The median age was 34 years (30–38), 13 (62%) were male, and the mean duration of clinical training after completion of medical school was 7.5 years (6–10). Eight fellows (38%) either held or were completing an advanced academic degree (masters, doctorate or post-doctorate). When asked about expected goals by the end of their fellowship programme, the vast majority of fellows expected to achieve technical (95%) and clinical (86%) expertise; and 95% did not plan to pursue additional training.

In terms of career plans, eight fellows (38%) believed HPB training would offer improved access to a more attractive job market. Nineteen fellows (90%) expected to have an HPB practice combined with: surgical oncology (9), general surgery (6) or transplantation (4). Seventeen fellows (81%) aimed to work in a university-based or academic institution. Fifteen (72%) believed the number of trainees was excessive.

### PD: demographics, current practice environment and HPB trainees

The response rate for PDs was 88% (23/26). The median age was 46 years (39–64) and 83% were male. The average duration of clinical training after medical school was 8 years (2–11), and 13 respondents (44%) held at least one advanced academic degree. Sixteen respondents (70%) estimated that non-HPB surgery comprised less than 30% of their practice. The most common surgical practice areas outside HPB were: surgical oncology (70%), general surgery (39%) and transplantation (26%). The median duration of clinical practice among PDs was 12 years (range: 2–32).

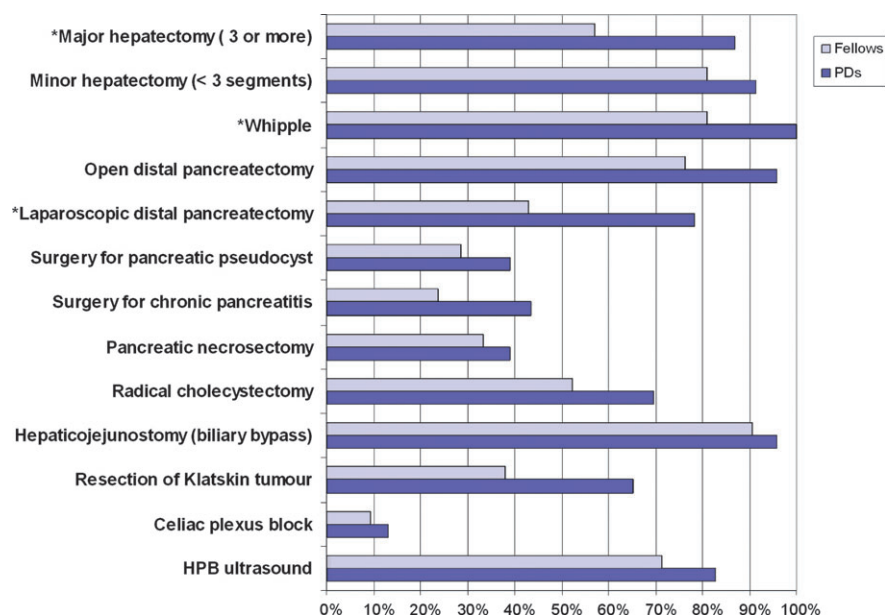
Fourteen PDs (61%) considered the number of HPB fellows to be excessive. Major challenges reported for HPB practice in the future were: controlling the quality of HPB training (52%), as well as the number of HPB surgeons (39%).

### Perception of adequacy of surgical volume

For all 13 HPB procedures, the volume of cases during training was more often considered 'good or excellent' by PDs than by fellows (Fig. 1). This difference reached statistical significance

**Table 1** Structure of questionnaires for programme directors and fellows

Programme directors	Fellows
Demographics (4 questions)	Demographics (4 questions)
Education (2 questions)	Education (3 questions)
Practice profile (5 questions)	Fellowship goals (6 questions)
Trainee experience with 13 core HPB surgical procedures.	Self-assessment of experience with 13 core HPB surgical procedures.
Trainee comfort with 14 core HPB surgical procedures.	Self-assessment of comfort with core HPB surgical procedures.
Future perspectives (5 questions)	Future perspectives (4 questions)



**Figure 1** Proportion of 'good or excellent' surgical volume for 13 core Hepato-Pancreato-Biliary (HPB) procedures after >9 months of HPB fellowship training according to fellows and programme directors (PDs). \* $P$ -value < 0.05

for major hepatectomies (PDs: 87% versus fellows: 57%,  $P = 0.04$ ), pancreaticoduodenectomies (100% versus 81%,  $P = 0.04$ ) and laparoscopic distal pancreatectomies (78% versus 43%,  $P = 0.03$ ).

Only a minority of PDs and fellows considered the volume of surgery for pancreatitis 'good or excellent', including: drainage procedures for pancreatic pseudocysts (39% of PDs and 29% of fellows); pancreatic necrosectomy (39% and 33%); and surgery for chronic pancreatitis (44% and 24%). Also, only 13% of PDs and 10% of fellows considered the volume of celiac plexus block performed as good or excellent.

### Comfort level to perform HPB surgeries

Trainees systematically rated their confidence to perform independently HPB procedures lower compared with PDs' perceptions (Fig. 2). This difference reached statistical significance for minor hepatectomies (96% versus 71%,  $P = 0.04$ ) and resection of Klatskin tumours (52% versus 19%,  $P = 0.03$ ).

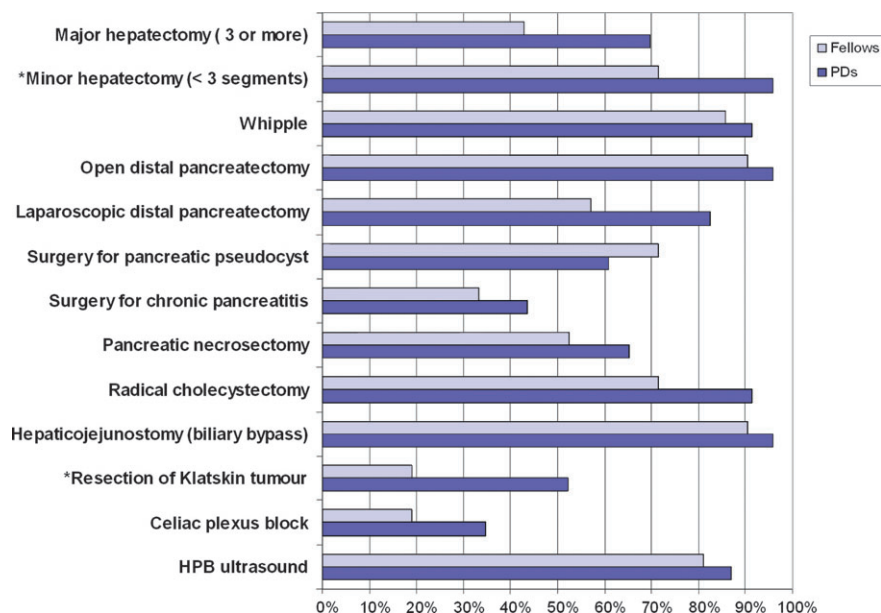
According to both PDs and fellows, a low percentage of fellows were confident to perform independently additional operations as well: drainage of a pancreatic pseudocyst (61% according to PDs and 71% according to fellows), chronic pancreatitis (44% and 33%), pancreatic necrosectomy (65.2% and 52.4%), resection of a Klatskin tumour (52% and 19%) and celiac plexus block (35% and 19%).

No association between PD's age and opinion about case volumes or fellow's preparedness was identified.

### Discussion

Subspecialty surgical training represents a complex interaction of trainee perceptions and goals that collide with programme/mentor beliefs and practices. This framework possesses elements of both the traditional apprentice model, as well as more formal international educational activities aimed at ensuring didactic and discussion-based subspecialty HPB content delivery.<sup>1</sup> Despite the perceived thoroughness of this model, the true preparedness of HPB surgical fellows to independently perform core HPB procedures remained unclear. It is also plausible that PDs and fellows may possess differing viewpoints on their readiness for practice. Given the challenging HPB manpower and job market for current graduates (72% of fellows and 61% of PDs believed too many HPB surgeons are being trained),<sup>5</sup> perceived readiness has become even more important to evaluate. PDs are also often viewed as the gatekeepers to manpower issues in addition to ensuring the quality and comfort of graduating trainees. As part of our "HPB Manpower and Education Study", the goal of this project was to evaluate and compare the viewpoints of both PDs and fellows with regard to the perceived adequacy of surgical experience as measured by case volumes and fellows' perceived preparedness to independently perform core HPB surgeries. Although the development of surgical ability is only one educational domain within HPB fellowship programmes, confirming the alignment of trainer's and trainee's opinions, as well as identifying perceived areas of weakness, is a necessary initial step.

This study clearly shows that there is a high level of overall agreement between PDs and HPB fellows with regard to per-



**Figure 2** Proportion of fellows confident to independently perform core Hepato-Pancreato-Biliary (HPB) procedures after >9 months of HPB fellowship training, according to fellows and programme directors (PDs). \**P*-value < 0.05

ceived weaknesses in fellows' operative abilities. This is similar to a report by our group describing thoracic surgery fellowships,<sup>4</sup> but dissimilar to results amongst orthopaedic surgical residents and their own PDs.<sup>5</sup> It is likely that the small size and highly motivated nature of subspecialty fellowships explain these more closely aligned points-of-view when compared with larger residency training programmes. The consistent, although not statistically significant, lower reported perceptions of both case volumes and procedure readiness amongst fellows (versus PDs) is also likely reflective of a knowledge gap in transition to practice issues and, therefore, a reasonable and potentially humbling trend.

Minor hepatectomy (< 3 segments), resection of hilar cholangiocarcinoma and celiac plexus block were procedures that HPB fellows reported being less commonly prepared for when compared with their PDs. This mix of procedures is interesting because it is comprised of both complex (Klatskin resection) and simple (celiac plexus block) technical requirements. As a result, it underscores the importance of both overall operative training volumes (both simple and complex), as well as pays particular attention to the inherent complexity in communicating/teaching more intricate procedures by our PDs and faculty alike. Not surprisingly given its impressive complexity, hilar cholangiocarcinoma resection represented the procedure with the near-lowest reported preparedness scores from both PDs (52%) and fellows (19%). It also represents a procedure that is relatively uncommon in most institutions. Other specific procedures with low reported preparedness scores were operations for chronic pancreatitis. This also represents the reality that a number of fellowship training pro-

grammes are predominantly oncology-based and, therefore, do not have the ability to offer significant experience and/or training in the complex decision-making inherent within pancreatitis-specific care. The association between volume and comfort for both hilar cholangiocarcinomas and chronic pancreatitis-related interventions are further supported by the observation that a minority of PDs and fellows considered the volume of surgery for pancreatitis as 'good or excellent' [i.e. drainage procedures for pancreatic pseudocysts (39% PDs; 29% fellows); pancreatic necrosectomy (39% and 33%); and surgery for chronic pancreatitis (44% and 24%)]. More to the point, significantly less than half of all PDs overall believed their volumes were 'good' in pancreatitis. Similarly, hilar cholangiocarcinoma resections were perceived to be 'good or excellent' by less than 40% of all HPB fellows.

Upon further exploration of the relationship between fellows' perception of operative exposure and their subjective ability to perform core HPB procedures, it seemed likely that fellows who reported their exposure to be 'good or excellent' would also have a high chance of perceived preparedness to perform that procedure independently.<sup>4</sup> Overall, this concept was widely true within our data set. This relationship was also true for the inverse (low volume, low preparedness) as most evident for Klatskin resections, chronic pancreatitis procedures and celiac plexus block. Unfortunately, this association is also clearly more complex, as the majority of fellows reported feeling prepared for independent practice to perform both pseudocyst drainage, as well as necrosectomy despite less than 'good' operative volume exposure. Given that the reported ability of trainees to accurately assess their own operative skills is high

elsewhere in the literature,<sup>8,9</sup> explanations for this observation may include either a misconception that pancreatitis operative interventions are typically simple, or perhaps that they believe they will not truly encounter many of these cases within their upcoming job. Interestingly, operations specific to chronic pancreatitis did not display this same pattern. However, laparoscopic distal pancreatectomy did, with less than 50% of fellows reporting 'good or excellent' case volumes, but with the majority perceiving an ability to perform them independently. To further complicate the volume–comfort association, the opposite pattern was noted for major hepatectomy, with the majority of fellows reporting 'good or excellent' case volumes, but only the minority perceiving independent procedure readiness. This occurred in the background context of PDs perceiving even higher rankings of operative volumes for this procedure. Given that a major hepatectomy is a common procedure for all HPB surgeons, this observation is concerning and will require more study.

It was also interesting to note that both fellows and PDs alike rated their case exposure and perceived readiness as 'good or excellent' with regards to HPB-specific ultrasound. This is probably related to the widespread diffusion of the importance and practicality of HPB ultrasound, also to the advanced and detailed training programme mandated by the AHPBA.

This study has several limitations. First, although we received an excellent response rate of 88%, there remains the possibility of a small minority of PDs and fellows who may not share the same opinions as the larger cohort. Second, although the survey was completed in April/May and, therefore, near the conclusion of the academic year, recall bias cannot be excluded. This timing also minimizes the fellow's surgical experience accrued in the final month(s) of training. Third, some HPB fellowship programmes are 2 years in duration and the responses in these programmes may represent a snapshot for a fellow who may have additional clinical training ahead. To address these issues, a follow-up survey is currently being distributed to all fellows. This survey is expected to account for fellows' additional surgical experience over the final month(s) of fellowship training, as well as accrue information about their initial independent practice and confidence. Fourth, a detailed assessment of the relationship between minimum case–volume requirements and outcome measures was not performed. Finally, although previous literature concludes that trainees can assess accurately their own operative abilities (especially as they have completed a full general surgical residency prior to entering an HPB fellowship), this study had no specific ability to ensure fidelity of its responses.

In conclusion, this study provides insight into the perceptions of both HPB fellows and their PDs with regards to the

adequacy of operative volumes and readiness of trainees to independently perform core HPB operations. It confirms good agreement between fellows and PDs regarding surgical talents and limitations. Most importantly, however, this project has identified resections of hilar cholangiocarcinoma, operations for chronic pancreatitis, and celiac plexus blockade as procedures that require increased focus and educational opportunities. Case volumes and comfort levels of fellows for major hepatectomy must also be further explored. Given that the vast majority of fellows (95%) expect to achieve technical and clinical expertise within an HPB fellowship, it is our duty as a faculty to ensure that their expectations are either met or adjusted.

#### Conflicts of interest

None declared.

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